

Solutions

Each answer shows the steps, then the **result**.

2.1

- steam (H_2O gas) with a phosphoric acid (H_3PO_4) catalyst

2.2

- shake with (orange) bromine water; an alkene decolourises it / turns it colourless

3.1 C

- HBr at room temperature gives a halogenoalkane

3.2 B

- The intermediate is a carbocation

3.3

(a)

- the $\text{C}=\text{C}$ double bond attacks the $\delta+$ bromine, with a curly arrow from the double bond; the $\text{Br}-\text{Br}$ bond breaks heterolytically, forming a carbocation and a Br^- ; the Br^- then attacks the carbocation to give 1,2-dibromoethane

(b)

- $n \text{CH}_2=\text{CH}_2 \rightarrow -(\text{CH}_2\text{CH}_2)_n-$

3.4

- adding H^+ to propene can form a secondary or a primary carbocation; the secondary carbocation is more stable, because two alkyl groups push electrons towards the positive carbon; the more stable (secondary) carbocation forms preferentially, giving 2-bromopropane